



Pozvánka na seminář a otevřený workshop v rámci projektu

Zvýšení účinnosti a bezpečnosti léčiv a nutraceutik: moderní metody – nové výzvy (EFSA – CDN)

Professor Virinder Parmar - Novel Polymeric Antioxidants and Bio-Antioxidants: Our Extensive Studies (*Abstrakt a stručný životopis viz níže*)

Marcel Hrubša. Overview of antiplatelet effects of new compounds from the laboratory of Prof. Parmar.

Václav Tvrdý. A novel method for screening of zinc chelation.

Monika Moravcová. Development of a novel method for screening of cobalt chelation.

Palma Federica Conte. Effect of chelators on copper triggered red blood cell hemolysis.

Místo konání: Univerzita Karlova
Farmaceutická fakulta v Hradci Králové
Seminární místnost katedry farmakologie a toxikologie (2464)

Termín: 30. 4. 2019, 15:00 hodin

Tento projekt, reg. č. CZ.02.1.01/0.0/0.0/16_019/0000841: Zvýšení účinnosti a bezpečnosti léčiv a nutraceutik: moderní metody – nové výzvy je spolufinancován Evropskou unií.



EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání



Novel Polymeric Antioxidants and Bio-Antioxidants: Our Extensive Studies

Virinder S. Parmar^{1,2}, Luciano Saso³, Ashok L. Cholli⁴ and Přemysl Mladěnka⁵

¹Bioorganic Laboratory, Department of Chemistry, University of Delhi (India); ²Department of Chemistry and Environmental Science, Medgar Evers College, The City University of New York (USA); ³Department of Human Physiology and Pharmacology, University of Rome 'La Sapienza', Rome (Italy); ⁴Polnox Corporation, Lowell, Massachusetts (USA); ⁵Department of Pharmacology and Toxicology, Charles University,

Hradec Kralove (Czech Republic)

Over the years, we have studied the anti-oxidant activities of different classes naturally occurring polyphenolic compounds, i.e. coumarins, xanthenes, flavonoids, etc. Structure-activity relationships have been drawn and synergistic effects of binary and ternary mixtures of these plant-based antioxidants with well-known antioxidants (DL- α -tocopherol, caffeic acid and L-ascorbic acid) have also been studied. The new binary antioxidant compositions of the studied compounds with DL- α -tocopherol demonstrate higher stability of the lipid substrate than the individual components. All ternary mixtures manifest strong synergism as a result of continuous regeneration of DL- α -tocopherol from both the studied antioxidants and L-ascorbic acid. Reaction schemes for explanation of the new effects observed have been obtained. The role of each component in the antioxidant compositions of ternary mixtures has been identified based on new equations composed by us.

Further, antioxidants are very important additives whose role is to maintain the chemical and physical properties of different materials such as plastics, elastomers, processed foods, lubricants, etc. during transportation, storage, processing and serving conditions. Although conventional antioxidants provide protection against the deleterious effects of reactive free radicals, they suffer from some serious drawbacks such as poor thermal stability, high volatility, poor processability, etc. owing to their molecular size. Various approaches have been followed to make high molecular weight macromolecular antioxidants. These high molecular weight antioxidants have improved extraction and migration resistance and thermal stability and processability, but their antioxidant activity performance suffers greatly. We have designed biocatalytic synthesis of novel polymeric antioxidants and carried out their evaluation for different applications. The polymeric antioxidants thus obtained show remarkably better efficacy and stability.

Results of these co-operative studies between Institutions in India, Italy, USA and Czech Republic shall be discussed in the Seminar.

Key References:

HG Raj, VS Parmar, SC Jain, S Goel, Poonam, Himanshu, S Malhotra, A Singh, CE Olsen and J Wengel. Mechanism of biochemical action of substituted 4-methylbenzopyran-2-ones. Part I: Dioxygenated 4-methylcoumarins as superb anti-oxidant and radical scavenging agents. *Bioorganic and Medicinal Chemistry* 6, 1998, 833-839.

MC Foti, SK Sharma, G Shakya, AK Prasad, G Nicolosi, P Bovicelli, B Ghosh, HG Raj, RC Rastogi and VS Parmar. Biopolyphenolics as antioxidants: Studies under an Indo-Italian CSIR-CNR project. *Pure and Applied Chemistry* 77, 2005, 91-101.

JZ Pederson, C Oliveira, S Incerpi, V Kumar, AM Fiore, P De Vito, AK Prasad, SV Malhotra, VS Parmar and L Saso. Antioxidant activity of 4-methylcoumarins. *Journal of Pharmacy and Pharmacology* 59, 2007, 1721-1728.



EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání



P Mladenka, K Macakova, L Zatloukalova, Z Rehakova, BK Singh, AK Prasad, VS Parmar, L Jahodar, R Hrdina and L Saso. In vitro interactions of coumarins with iron. *Biochimie* 92, 2010, 1108-1114.

VD Kancheva, L Saso, PV Boranova, A Khan, MK Saroj, MK Pandey, S Malhotra, JZ Nechev, SK Sharma, AK Prasad, MB Georgieva, C Joseph, AL DePass, RC Rastogi and VS Parmar. Structure-activity relationship of dihydroxy-4-methylcoumarins as powerful antioxidants: Correlation between experimental & theoretical data and synergistic effect. *Biochimie* 92, 2010, 1089-1100.

F Natella, B Lorrain, AK Prasad, VS Parmar, L Saso and C Scaccini. 4-Methylcoumarins as antioxidants: Scavenging of peroxy radicals and inhibition of human low-density lipoprotein oxidation. *Biochimie* 92, 2010, 1147-1152.

M Giuseppa, T Domenico, BK Singh, AK Prasad, VS Parmar, N Clara, M Ferdinando, S Antonina, C Mariateresa, F Omidreza and L Saso. Antioxidant properties of 4-methylcoumarins in in vitro cell-free systems. *Biochimie* 92, 2010, 1101-1107.

I Kostova, S Bhatia, P Grigorov, S Balkansky, VS Parmar, AK Prasad and L Saso. Coumarins as antioxidants. *Current Medicinal Chemistry* 2011, 18, 3929-3951.

A Dhawan, V Kumar, VS Parmar and AL Cholli. Novel polymeric antioxidants for materials. *Antioxidant Polymers: Synthesis, Properties and Applications*. Editors: G Cirillo and F Iemma. Wiley & Scrivener Publishing LLC 2012, pp. 385-426, DOI: 10.1002/9781118445440.ch13.

K Macáková, Z Reháková, P Mladenka, J Karlíková, T Filipický, M Říha, AK Prasad, VS Parmar, L ek Jahodár, P Pávek, R Hrdina and L Saso. In vitro platelet antiaggregatory properties of 4-methylcoumarins. *Biochimie* 2012, 94, 2681-2686.

S Kumar, S Malhotra, AK Prasad, EV Van der Eycken, ME Bracke, WG Stetler-Stevenson, VS Parmar and B Ghosh. Anti-inflammatory and antioxidant properties of Piper species: A perspective from screening to molecular mechanisms. *Current Topics in Medicinal Chemistry* 15, 2015, 886-893.



EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání


MINISTERSTVO ŠKOLSTVÍ,
MLÁDEŽE A TĚLOVÝCHOVY



Biography of Professor Virinder Parmar

Professor Virinder Parmar, born on 2nd November 1948 at Allahabad (India) is a Naturalized US Citizen. He did B.Sc. Honors, M.Sc. and Ph.D. from the University of Delhi (India), and has worked for nearly 10 years as a Postdoctoral/Visiting Scientist at Cornell University, Harvard University, University of Massachusetts Lowell (UML), NYU-Poly and MIT (USA); the University of Basel (Switzerland) and the Imperial College of Science, Technology and Medicine (London, UK).

He has been a faculty at St. Stephen's College and the University of Delhi for 44 years, he recently retired as Full Professor of Chemistry and has served as Head of the Department of Chemistry and as Chairman of the Board of Research Studies, and Provost of Gwyer Hall at this University. He has been a Visiting Full Professor at the Institute of Nanoscience and Nanomedicine (INSET), University of Massachusetts Lowell (UML, USA) from March 2001 to December 2005, an Honorary Professor of Organic Chemistry at the University of Southern Denmark (SDU) since March 2008, a Visiting Professor at Indiana University-Purdue University (IUPUI, Indianapolis, USA) in May-June 2015, an Adjunct Professor at Long Island University, Brooklyn (LIU, New York, USA) in January-April 2013, a Visiting Professor at the Institute of Advanced Sciences, Dartmouth (INADS, MA, USA) since November 2016 and a Visiting Professor at the Central University of Haryana (CUH, India) since February 2016. He was appointed Full Tenured Professor of Chemistry & First Head of the Department of Nanoscience of the newly formed Joint School of Nanoscience & Nanoengineering (JSNN) at the University of North Carolina Greensboro (UNCG, USA). He has been an awardee of Medals for Excellence in Research from the Chemical Research Society of India (CRSI, Bangalore) for the year 2001 and of the Indian Society of Chemists and Biologists (ISCB, Lucknow) for the year 2009. He has been a recipient of the Academic Staff Award from the EXPERTS II Consortium of the European Union (EU) in December 2012 and April 2013.

Professor Parmar's research interests include: Green/Sustainable Chemistry, Nanotechnology, Organic Synthesis, Nucleic Acid Chemistry, Advanced Materials, Medicinal Chemistry, Biocatalysis and the Chemistry of Natural Products. He has mentored 85 Ph. D. and Postdoctoral Scientists in several Belgian, British, Canadian, Danish, Dutch, French, German, Indian and US Universities, and has published 492 research papers (in 2018: 7; in 2017: 7; in 2016: 11) in journals of high repute (published by ACS, RSC, Elsevier, Wiley, VCH, MDPI, Springer, Thieme, etc.; **h-Index: 43/35; Citation Index: 47.26; Number of Citations: 8,300; Number of Reads: 169,000; Number of Readers: 4,200**) in addition to being co inventor on 21 Patents and having co-authored six Books & Edited six special Issues of Journals.

He has handled thirty two research projects involving grants of nearly US Dollars 11.60 million obtained from various agencies and corporations in USA, UK, Germany, Denmark, Italy and India in international collaboration with twenty six research groups in USA, UK, Russia, Italy, India, Germany, France, Sweden, Canada, Denmark, Bulgaria, Czech Republic, The Netherlands and Belgium. He has organized 26 conferences/symposia/seminars/workshops/colloquia in the areas of his research interests.

He has delivered Invited / Plenary Lectures at 147 international meetings and has given 398 Research Seminars at 293 Institutions in 31 Countries across the Globe. He is the Executive Editor of the Journal '*Biocatalysis and Biotransformation*', and has been on the Editorial Boards of the Journals: ChemSusChem, Mendeleev Communications, Indian Journal of Chemistry, Natural Product



EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání



Communications, Arkivoc, Molecules and ISRN Medicinal Chemistry. He is a regular reviewer for several journals published by the American Chemical Society, the Royal Society of Chemistry (London), Elsevier & Wiley-VCH, etc., and is a member of the IUPAC's Subcommittee on Biomolecular Chemistry and the Interdivisional Committee on Green Chemistry for Sustainable Development (ICGCSD).



EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání

